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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/538,540	06/11/2005	Shahram Mihan	LU 6084 (US)	4071

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EXAMINER

LEE, RIP A

ART UNIT PAPER NUMBER

1713

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/19/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/538,540

Applicant(s)

MIHAN ET AL.

Examiner

Rip A. Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 October 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 16-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 16-29 is/are rejected.
- 7) ☒ Claim(s) 20, 21, 23, 24 and 25 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>10-10-2006</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This office action follows a response filed on October 10, 2006. Claims 1-15 were canceled. New claims 16-29 are pending.

Claim Objections

1. Claims 20, 21, 23, 24, and 25 are objected to because of the following informalities: The claims indicate that the at least one activating compound is optional. There is no evidence in the record that active catalysts containing the claimed metallocene do not contain at least one activating compound. Appropriate correction is required.
2. Claim 25 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 24. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim 24 is drawn to a process comprising copolymerizing ethylene and α -olefins in the presence of a catalyst system wherein the process produces a copolymer of ethylene with α -olefins exhibiting certain properties. Claim 25 is drawn to a process for preparing a copolymer of ethylene with α -olefins exhibiting certain properties comprising polymerizing ethylene with α -olefins in the presence of a catalyst system.

The catalyst system and the properties recited in both sets of claims are identical. Therefore, despite the slight difference in wording, the subject matter of claim 25 appears to be a substantial duplicate of claim 24.

Claim Rejections - 35 USC § 102 / 35 USC § 103

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 16-20, 28, and 29 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Wang *et al.* (WO 01/92346; equivalent document U.S. 6,723,675).

Wang *et al.* teaches a catalyst and use of the catalyst in a process of polymerizing ethylene and α -olefin (claims 7 and 12). The bridged complex, (2-pyridylmethyl)(Ind)CrCl₂ is representative (example 5). Clearly, the process of the prior art is essentially as that described in claims 20 and 29, and it follows that the products prepared by essentially the same process will exhibit essentially the same properties. Therefore, it is maintained that the copolymer prepared by Wang *et al.* inherently possesses the properties recited in claims 16-20. The subject matter of claim 28 is disclosed in column 3, line 10, in which Wang *et al.* teaches molded articles and films as end use for inventive polymers.

5. Claims 16-18 and 27 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kale *et al.* (U.S. 6,420,507).

Kale *et al.* teaches a series of ethylene/1-octene copolymer exhibiting density of about 0.870 g/cm³, M_n on order of about 44,000-57,000, and M_w/M_n in the range of about 2.2-2.8 (see entries 1a-c and 2a-d in tables 2 and 5). Copolymers prepared from these catalysts also exhibit bimodal short chain branching distribution (col. 54, line 36). The reference is silent with regard to the CDBI and side chain branching per 1000 carbon atoms, however, light of the fact that the copolymer exhibits essentially the same properties and in view of the fact that the branching distribution is bimodal, a reasonable basis exists to believe that the claimed broad CDBI and side chain branching range is associated with bimodal distribution, and therefore, these properties are also exhibited by the polymers of Kale *et al.* Since the PTO can not conduct experiments, the burden of proof is shifted to the Applicants to establish an unobviousness difference. *In re Fitzgerald*, 619 F.2d. 67, 205 USPQ 594 (CCPA 1980). See MPEP § 2112-2112.02.

Preparation of blend is disclosed in Kale *et al.* (col. 6, line 50), and therefore, it would have been obvious to one having ordinary skill in the art to use the inventive polymer in blends.

6. Claims 16-19 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Jejelowo *et al.* (U.S. 5,281,679).

Jejelowo *et al.* discloses polymer H, prepared by chromium based catalyst, exhibiting a density of 0.920 g/cm³, M_n of 14,000, M_w/M_n of 7.1, and CDBI of 25.9 %. The reference is silent with respect to the modality of the branching distribution and side chain branching per 1000 carbon atoms. It is noted that the polymer contains a significant hexanes extractables fraction, indicating the presence of low molecular weight components and components with high frequency of short chain branching (regardless of molecular weight); see column. 16, lines 36-40. In view of the low CDBI, which reflects non-uniform branching distribution, the presence of hexanes extractables, and in light of the fact that the polymer is prepared by a chromium catalyst and exhibits the claimed density and molecular weight features, a reasonable basis exists to believe that the polymer in Jejelowo *et al.* exhibits the other properties recited in the instant claims. Since the PTO can not conduct experiments, the burden of proof is shifted to the Applicants to establish an unobviousness difference. *In re Fitzgerald*, 619 F.2d. 67, 205 USPQ 594 (CCPA 1980). See MPEP § 2112-2112.02.

7. Claims 16-19, 21, 22, 24-26, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mihan *et al.* (WO 01/12641).

Mihan *et al.* teaches a general catalyst system comprising (un)substituted monocyclopentadienyl chromium (III) complexes. The transition metal component has structure defined by structural components (I) and (II), as shown on page 6. One notes that the π -ligand has bridging group B and pendant moiety Z. The bridging group is of formula $L^2(R^{13})(R^{14})$ where L^2 is carbon or silicon. Z is a heterocyclic moiety, and page 8 shows that this is a 2-pyridyl or 8-quinolyl group, and substituted derivatives thereof are preferred (page 8, lines 45-47). Surprisingly, the examples of Mihan *et al.* do not show a single organometallic complex containing the requisite bridging group $L^2(R^{13})(R^{14})$, as disclosed in the body of the patent. There is disclosed the complexes (8-quinoliny)(Ind)CrCl₂ and (2-Me-8-

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quinolinyl)(Me₄C₅)CrCl₂, in examples 8 and 10, where the quinolinyl moiety is bound directly to the Cp ligand, but no bridging group exists in either complex (see experimental and supporting ¹H NMR data). Despite this, one of ordinary skill in the art would have found it obvious to follow the teachings of the disclosure and claims and make the corresponding bridged derivatives of these compounds because this is the actual scope of the disclosure of the patent. Thus, one of ordinary skill in the art would have found it obvious to make [L²(R¹³)(R¹⁴)](8-quinolinyl)(Ind)CrCl₂ and [L²(R¹³)(R¹⁴)](2-Me-8-quinolinyl)(Cp)CrCl₂ and thereby arrive at the catalyst of the instant claims, and since the patent teaches use of catalysts in a process of polymerizing olefins, the skilled artisan also would have found it obvious to do likewise with the catalyst comprising the bridged derivative. One of ordinary skill in the art also would have found it obvious to arrive at the claimed process using a substituted 2-pyridyl analogue because Mihan *et al.* teaches such an embodiment (see page 8, structure in line 5, and discussion lines 45-47). Obviously, Mihan *et al.* does not show a polymer product derived from the catalysts claimed in the text, however, a reasonable basis exists to believe that the product would exhibit the properties recited in the instant claims because the catalyst disclosed by Mihan *et al.* and the polymerization process using the catalyst is essentially the same as that recited in the instant claims. Since the PTO can not perform experiments, the burden is shifted to the Applicants to establish an unobviousness difference. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

8. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang in view of Welch *et al.* (U.S. 5,498,581).

Wang contemplates that inventive catalysts may be in the form of prepolymer (page 10, lines 22-29), but there is not teaching as to how this type of catalyst is made. Welch *et al.* teaches that 5-80 wt % of prepolymer relative to the mass of resulting prepolymerized solid catalyst system is a practical working range for transition metal catalyzed olefin polymerizations. It would have been obvious to one having ordinary skill in the art to use the amount taught by Welch *et al.* in making the prepolymer disclosed in Wang because this has been shown to produce useful catalysts, and consequently, the skilled artisan would have expected such an

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embodiment to work. The combination is obvious since both patents relate to olefin polymerization processes.

Response to Arguments

9. Applicant's arguments with respect to the rejection of claims over Stehling *et al.* have been fully considered and are persuasive. Indeed, the prior art discloses a blend of two separate polymers, one of which is essentially polyethylene homopolymer. Consequently, the rejection has been withdrawn.

Applicants traverse the rejection of claims over Mihan *et al.*, indicating that the reference does not teach the features of the instant claims. It is noted that the rejection is based on obviousness rather than anticipation. Applicants have not shown why one of ordinary skill in the art would not have found it obvious to arrive at the claimed process, especially in view of the fact that preparation of olefins in the presence of catalyst comprising chromocene-type complexes containing the bridging group $L^2(R^{13})(R^{14})$ is clearly disclosed and made obvious in the claims. Also, there is no showing that such catalysts do not produce the claimed copolymers.

In light of this and previous discussion, the rejection of record has not been withdrawn.

Information Disclosure Statement

14. U.S. Patent No. 5,625,016 to Shiffino *et al.* (page 1) was not considered because a copy of the patent was not submitted with the previous response.

Prior Art of Record

15. A preliminary search report of corresponding PCT/EP03/014437 (as WO 2004/056878) lists the following references as "X" references:

- D1) WO 01/12641 (same as U.S. 6,437,161; Mihan *et al.*, cited herein)
- D2) WO 01/12687 (same as U.S. 6,911,516)
- D3) WO 01/96417 (same as U.S. 6,924,248)
- D4) WO 01/92346 (same as U.S. 6,723,675; Wang *et al.*, cited herein)
- D5) Bradley *et al.* (*Organometallics*, 2002)

References D2, D3, and D5 do not teach or make obvious the subject matter of the instant claims. In particular, reference D2 illustrates use of chromium complexes to produce copolymer having CDBI of greater than 70 %; complexes contain a heteroaromatic group attached directly to the carbocyclic ligand.

The prior art made of record but not relied upon is considered pertinent to the Applicant's disclosure.

Ferri *et al.* (U.S. 6,737,130) discloses substantially spherical polyolefin having density of 0.85 to 0.89 g/cm³, M_w/M_n less than 3, and short chain branching level of about 60-100 (per 1000 carbon atoms). For every 100 branches that are methyl, there are about 1-80 ethyl branches, 1-20 propyl branches, 1-50 butyl branches, 1-20 amyl branches, and 1-100 hexyl or longer branches. The exact modality of the braching distribution is not made clear, and the CDBI appears to lie outside the claimed range since the polymer is substantially homogeneous (see discussion column 8 and 10).

Spenadel *et al.* (U.S. 5,246,783) discloses a copolymer having a density of 0.86 to 0.96 g/cm³, M_w/M_n of 1.5-30, and CDBI greater than 45 %.

Kazakov *et al.* (U.S. 6,642,313) teaches a polyolefin containing 80 wt % ethylene having density greater than 0.94 g/cm³, M_w/M_n greater than 3.5, and CDBI greater than 50 %. There composition contains a high molecular weight component containing 0.0-4.4 branches/100 carbons and a low molecular weight component containing 0.5-6.1 branches/100 carbons.

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Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

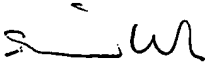
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rip A. Lee whose telephone number is (571)272-1104. The examiner can be reached on Monday through Friday from 9:00 AM - 5:00 PM. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached at (571)272-1114. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <<http://pair-direct.uspto.gov>>. Should you have questions on the access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

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January 11, 2007


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